Substitute Specification (Clean Copy)

METHOD FOR NEGOTIATING QUALITY OF SERVICE PARAMETERS IN AN INTELLIGENT NETWORK

TECHNICAL DESCRIPTION OF THE INVENTION

The invention is directed to a method for negotiating specific quality of service parameters in an intelligent network, particularly a B-ISDN, required for the service provider and by the network itself.

BACKGROUND OF THE INVENTION

Below, the term intelligent network (IN) is employed for a communication network having an architecture and specific, marked network elements that make what are referred to as IN services available that can be employed by the network subscribers.

The term quality of service parameter describes all parameters of a connection that are freely selectable to a certain scope and are newly set in every connection, for example the band width employed for a connection.

There are specific network elements, what are referred to as service control points (SCP), in an intelligent network. Each service provider that is newly introduced into such a network must previously announce himself to the SCP, particularly the nature of his service and his address. The SCP is thus in the position to be able to forward a call of an IN service from an arbitrary network user to the service provider responsible for this. Currently, for example, it is already possible to reroute a call to various service providers (for instance, an announcement service) dependent on the time of day.

The exchange (SSP) thereby first calls the SCP without further collaboration of the party calling the service in order to obtain the required address information.

The actual set up of the payload connection between the party calling the service and the service provider subsequently occurs in that the SETUP command (see Q.2931 with respect thereto) of the

party calling the service is routed to the correct address. Specific parameters valid for this payload connection are thereby set or, respectively, negotiated.

For example, the negotiation of the band width employed in the connection occurs during the connection set up. A subscriber setting up a connection thereby proposes at least one band width (required, alternative, minimum acceptable).

The called subscriber and the communication network themselves can then select a suitable band width that is appropriate to the demands of the subscriber setting up the connection. The selected band width is communicated to the subscriber setting up the connection and is employed for this connection (see Q.2725.1, B-ISDN CS-2 with respect thereto).

European Patent EP 0 698 066, "Telecommunications system with active database", discloses a method that improves the routing in telecommunication networks. A separate data bank contains updated charge particulars, i.e. how much network operators ask for the use of the services in this network. These particulars can be employed for the selection of a cost-optimum route through the networks.

SUMMARY OF THE INVENTION

An object of the invention is to provide a method with which a faster, simple and resource-saving negotiation of the quality of service parameters made available for a communication service is enabled.

This object is achieved in that the SCP is already made aware of the possible values for specific parameters when the new service provider is established.

When this service is called, the negotiation of these parameters then only occurs between the user of the service and the SCPo The negotiated value is entered in the SETUP message to be forwarded. The service provider is thus already informed of the final value. The procedure is thereby not limited to the parameters that are described at the moment in the SETUP message according to Q.2931 but can be arbitrarily expanded to parameters required in future.

The following advantages derive due to the inventive procedure:

* Relieving the end systems, data servers are not busied with the negotiation of parameters

* Relieving the communication network, the messages for connection negotiation no longer need be transported through the entire network. Particularly great relief occurs when the connection does not occur for specific reasons.

* Low outlay when processing calls

The calls are generally conducted via a plurality of network elements (SSP, service switching points) in the network; the negotiation of the parameters therein occurs at all of what are referred to as NNI (network node interface) between respectively two SSP (dependent on the nature of the parameter). As a result of an inventive procedure, the number of negotiations of the parameters is limited to one.

* Lower implementation outlay:

It is not necessary at the service switching points (SSP) to implement the complete Q.2962 and Q.275.1; a negotiation procedure need not be implemented at a called system (the service provider).

Advantageous developments and improvements are recited in a method as set forth above including specifying an allocation of the substructures to applications in a connection-specific manner. Preferably, the method includes specifying in a connection-specific manner whether or not all structures of the ATM adaptation layer frame are a same size. If not all substructures of an ATM adaptation layer frame are a same size, the method provides for limiting a number of ATM cells per ATM adaptation layer frame to five. The number of ATM cells contained in an ATM adaptation layer frame is specified by signaling in a set-up of a connection.

In one embodiment, the present invention calls for specifying a number of ATM cells contained in an ATM adaptation layer frame administratively in establishing a connection. Additionally, an item of subscriber-to-subscriber information is further specified in a connection-specific manner for the substructures.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is explained below on the basis of exemplary embodiments.

Figure 1 is a schematic diagram of an exemplary intelligent network having a service user (user A) and a service provider (user B) as well as service switching points (SSP) and at least one SCP (service control point).

Figure 2 is a communication diagram which shows an exemplary scenario for a simple IN call ("number translation") wherein a broad band negotiation ensues between a multimedia terminal equipment (customer premises Equipment, CPE) and a service control point (SCP).

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The information elements (IE) from Q.2931 and broad band intelligent network application protocol (B-INAP) parameters from Q.1224 are employed in the broad band negotiation for this service. The necessary expansions of the service elements are implemented. The procedures as described in Q.2962 are thereby employed.

The individual steps from Figure 2 are explained below, these being implemented during a connection set up when an IN service is called (for example, "number translation", the conversion of one telephone number into another). One thereby proceeds inventively given the parameter "ATM traffic descriptor" (bad width). The service elements already known from Q.2931 and Q.1224 are expanded (only the service elements critical for the invention are recited below).

1. Setup (Q.2931)

Call from service user (for example, multimedia terminal equipment, CPE) to the service switching point (SSP)

Called party number-IE

Calling party number-IE (optional)

ATM traffic descriptor

Alternative ATM traffic descriptor (optional)

Minimum acceptable A TM traffic descriptor (optional)

A network subscriber wishes to use a service of the communication network IN. For this purpose, he sends this command to the network with a service number contained in the called party IE that identifies the desired service. In addition, the call contains further information about the quality of the desired service and contains addresses.

InitialDP (Q.1224)

Service switching point to service control point

Call ID

ATM traffic descriptor

Alternative ATM traffic descriptor (optional)

Minimum Acceptable A TM traffic descriptor (optional)

Previously, only the address of the service provider was thereby identified.

By contrast to the negotiation of the band width described in Q.2962, additional parameters are checked and the connection is already rejected at this point in time if the demands of the party calling the service cannot be met. When the parameter is negotiable, like the band width in this exemplary case, then this is already ultimately defined at this point in time.

Connect (Q.1224)

Service Control Point to Service Switching Point

Call ID

Destination Routing Address

ATM traffic descriptor (optional)

This call sees to it that the SETUP call contains the defined band width and is forwarded to the correct address.

CALL PROC (Q.2931)

Service switching point to the service user

This service element provides information that the connection requested with SETUP is being set up and no further information are required for this connection call.

2. Setup (Q.2931)

Service switching point to server (service provider)

What is thereby fundamentally involved is the first set up from the service user to the SSP, whereby the ultimate value of the ATM descriptor (the declared band width) was already entered in the negotiation with the SCP, i.e. further negotiation is neither necessary nor possible.

1. CONNECT (Q.2931)

Server to service switching point

With this connect, the service user is informed that his call was accepted.

2. CONNECT (Q.2931)

Service switching point to service user

ATM traffic descriptor (optional)

In this message, the service user can be informed of the band width employed for the connection that has been set up.

1. CONNECT ACK (Q.2931)

Service switching point to server

Acknowledgment of first CONNECT

This is the confirmation for the called party that the requested connection has now been established.

2. CONNECT ACK (Q.2931)

CPE to service switching point

acknowledgment of second CONNECT

This confirmation is optional, in order to preserve symmetry.

The band width negotiation implemented as in Q.2962 seems recommended for the user calling the service. The called subscriber (service provider), however, does not notice anything of the band width negotiations since the service control point (SCP) already selects the suitable band width).

Another exemplary application of the invention is comprised in the possibility of establishing a plurality of service vendors for identical services in an intelligent network. These differ only in terms of the quality of service offered, such as, for instance, the band width that is available. The SCP connects a service user to the service provider who can best satisfy his demands. This is only possible when the SCP has already stored the corresponding data upon establishment of the service.

Although other modifications and changes may be suggested by those skilled in the art, it is the intention of the inventors to embody within the patent warranted hereon all changes and modifications as reasonably and properly come within the scope of their contribution to the art.

List of Abbreviations

ATM Asynchronous Transfer Mode
CPE Customer Premises Equipment
IE Information Element
IN Intelligent Network
NNI Network Node Interface
SCP Service Control Point
SSP Service Switching Point
UNI User-Network Interface

References:

Q.1224
ITU-T, Study Group 11:
"Distributed Functional Plane for Intelligent Network - Capability Set-2", Draft Recommendation Q.1224, December 1996

Q.2725.1
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Q.2931
ITU-T, Study Group II: "Broadband-integrated Service Digital Network (B-ISDN) - Digital Subscriber Signalling System No.2 (DSS2) - User Network Interface (UNI) Layer 3 Specification for basic Call/Connection Control", ITU-T Recommendation Q.2931, February 1995

Q.2962
ITU-T Study Group 11:

"Broadband-integrated Service Digital Network (B-ISDN) - Digital Subscriber Signalling system No.2 (DSS2) - Connection Characteristics Negotiation during Call/Connection Establishment Phase", Report R167, March 1996

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~~Thereby shown are:~~

~~Figure 1~~

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Call ID
ATM traffic descriptor
Alternative ATM traffic descriptor (optional)
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1. CONNECT (Q.2931)
Server to service switching point
With this connect, the service user is informed that his call was accepted.

2. CONNECT (Q.2931)
Service switching point to service user
ATM traffic descriptor (optional)
In this message, the service user can be informed of the band width employed for the connection that has been set up.

1. CONNECT ACK (Q.2931)
Service switching point to server
Acknowledgment of first CONNECT
This is the confirmation for the called party that the requested connection has now been established.

2. CONNECT ACK (Q.2931)

CPE to service switching point
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This confirmation is optional, in order to preserve symmetry.

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IN ~~Intelligentes Netz~~ **Intelligent Network**

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~~Literaturverzeichnis~~

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Q.2931

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